REMARKS

Claims 1 and 6 have been amended.

The Examiner has rejected applicant's claims 1, 2, and 5-8 under 35 USC 103(a) as being unpatentable over the TeWinkle (U.S. Pat. No. 7,164,506) patent in view of the Saito, et al. (U.S. Pat. No. 7,042,491) patent. Claims 3, 4, 9, and 10 have been rejected under 35 USC 103(a) as being unpatentable over the TeWinkle patent in view of Saito, et al. patent and further in view of the Okisu, et al. (U.S. Pat. No. 6,571,022) patent. Applicant has amended applicant's independent claims 1 and 6, and with respect to these claims, as amended, and their respective dependent claims, the Examiner's rejections are respectfully traversed.

Applicant's independent claim 1 has been amended to recite an image sensing apparatus comprising: an image sensing element includes a first light receiving area and a second light receiving area which are formed on an image pickup surface of a semiconductor substrate by the plurality of divisional exposure operations, wherein pixel signals obtained by the first light receiving area and the second light receiving area are read out from the image sensing element via a same channel; a correction device which corrects difference between output levels of pixel signals output from the first light receiving area and the second light receiving area via the same channel; and a control device which controls to write a signal corrected by said correction device to a frame memory. Applicant's independent claim 6 has been similarly amended.

Accordingly, applicant's claimed invention has at least the following features:

(i) an image sensing element that includes a first light receiving area and a second light receiving area which are formed on an image pickup surface of a semiconductor substrate by a plurality of divisional exposure operations;

(ii) pixel signals from the first and second light receiving areas of the image sensing element being outputted from the image sensing element via the same channel, where the difference between the output levels of pixel signals from the first and second light receiving areas caused by the plurality of divisional exposure operations is corrected by a correction device; and

(iii) the corrected signal being written to a frame memory.

These features allow manufacturing of an image sensor having a size as large as a conventional silver halide film, such as that of a 135 format film camera. Although this size of the image sensor is desirable, image sensors of this size cannot be manufactured using the conventional techniques.

None of the cited prior art references disclose the above features of applicant's claims 1 and 6. In particular, the TeWinkle and Saito, et al. patents, alone or in combination with one another, fail to teach or suggest at least an image sensing element that includes a first light receiving area and a second light receiving area which are formed on an image pickup surface of a semiconductor substrate by the plurality of divisional exposure operations, where pixel signals obtained by the first light receiving area and the second light receiving area are read out from the image sensing element via the same channel and a correction device which corrects difference between output levels of pixel signals output from the first light receiving area and the second light receiving area via the same channel, as recited in applicant's independent claim 1.

As discussed in applicant's previous response, the TeWinkle patent discloses an image sensor bar 10 which includes a plurality of image sensor array chips 12 mounted on a substrate and butted end-to-end so that the arrays of photosensors on each chip form a single linear array of photosensors. (See, col. 2, line 64-col. 3, line 2; FIG. 1). Each chip 12 in TeWinkle includes at least one row 20 of photosensors arranged in a linear array, and each photosensor in the linear array is connected to a transfer circuit 22 controlled by a shift register 24. (Col. 3, lines 30-46; FIG. 2.) TeWinkle also teaches that each chip includes an "output enable" (OE) connection, which connects to the shift register and causes the shift register to sequentially output the image related charges to a "video out" (VO) connection. (See, FIG. 1 and 2; col. 3, lines 4-17 and 54-58). However, the TeWinkle patent does not teach or suggest reading out the output pixel signals of the first and second light receiving areas via the same channel, where the first light receiving area and a second light receiving area are formed on an image pickup surface of a semiconductor substrate by the plurality of divisional exposure operations.

In the Office Action, the Examiner has disagreed with the above argument and has argued that the TeWinkle patent teaches a subset of chips that are configured to output video data in a single serial stream (FIG. 7, item 12; col. 4, lines 66-67), that the subset of chips outputs onto a common output line, and thus acts as one large chip with a single shift register (col. 5, lines 4-12). The Examiner has also argued that TeWinkle's common output line may be interpreted as applicant's "the same channel" and two different chips of TeWinkle that output image signals onto the common output line may be interpreted as applicant's "first and second light receiving areas." (See Final Office Action, page 2). Applicant respectfully disagrees.

More specifically, the TeWinkle patent teaches that the video data can be outputted from a set or subset of chips 12 in a single serial stream onto a common output line, where the shift register lines of the chips are connected and a short pulse is moved along the shift registers so as to cause the photosensors of the chips to serially output the video data, moving from one chip to another. (See, FIG. 7; See, col. 4, line 62-col. 5, line 47). However, the TeWinkle patent also teaches that each chip is independent as every chip has an OE (output enable line) connection and a VO (video out line) connection. (See, e.g., FIGS. 1-7). Therefore, though TeWinkle discloses that the outputs from the chips may be serially read out by connecting the shift registers of the chips and by moving the OE pulse sequentially from one chip to another, the created serial readout arrangement is formed by appropriately connecting respective chips' VO lines.

In other words, although TeWinkle discloses that pixel signals from two different chips may be transported using the serial readout arrangement, TeWinkle also teaches that when such pixel signals are read out from the chips, the pixel signals are respectively read out via the individual VO lines of the two different chips, and thus, are not read out via the same channel. Accordingly, the structure of the image sensor bar in TeWinkle is different from the structure of the image sensing element of applicant's independent claims 1 and 6, in which an image signal of the first light receiving area and an image signal of the second light receiving area are read out via the same channel.

In addition, the Examiner has acknowledged that the Saito, et al. patent is silent with respect to the above features (see Final Office Action, page 4). Thus, applicants submit that the TeWinkle and Saito, et al. patents do not teach or suggest at least reading out the output pixel signals of the first and second light receiving areas via the same channel, where the

first light receiving area and a second light receiving area are formed on an image pickup surface of a semiconductor substrate by the plurality of divisional exposure operations, as recited in applicant's independent claims 1 and 6.

Further, none of the cited references teach or suggest a correction device which corrects difference between output levels of pixel signals output from the first light receiving area and the second light receiving area via the same channel. The Examiner has acknowledged that the TeWinkle patent does not teach a correction device or a controlling device controlling the correction device. (See Final Office Action, page 6). However, the Examiner has argued that Saito teaches the correction device of applicant's independent claims. In particular, the Examiner has argued that the Saito patent teaches that the difference in sensitivity between respective line sensor arrays may cause adverse effects in the output images and how to correct for such sensitivity difference, and thus teaches applicant's correction device. (See Final Office Action, pages 6-7). Applicant respectfully disagrees at least for the reasons stated below.

As discussed in applicant's previous response, Saito, et al. discloses an image signal output device that determines a distance to the subject for use in a focusing operation, and which includes a pair of photoelectric converter line sensor portions 11a, 11b, gate portions 12a, 12b corresponding to the line sensor portions 11a, 11b, respectively, that control accumulation of electric charges in the line sensor portions 11a, 11b. (See, FIG. 1; col. 4, lines 6-28). In Saito, et al., each line sensor portion 11a, 11b outputs a pixel output via a corresponding gate portion 12a, 12b and to a corresponding CCD shift register 13a, 13b. Each pixel output in Saito, et al. is then converted into a digital value by the A/D converter (ADC) portion 22, which switches the conversion range based on the output difference

(sensitivity difference) between the line sensor portions in order to correct the sensitivity difference between the line sensor portions. (See, col. 8, line 43-col. 9, line 13 and col. 9, lines 57-64). As shown in FIGS. 1 and 7 of Saito, et al. (see also, Col. 4, lines 12-21), the line sensor portions of Saito, et al. are two separate image sensing elements, each of which separately outputs respective pixel signals via a corresponding gate portion and CCD shift register.

In other words, Saito, et al. teaches correcting sensitivity difference of output signals of two individual line sensors. In contrast, applicant's claims recite correcting the difference between output levels of pixel signals output from the first and second light receiving areas, which are integral parts of a single image sensing element formed on the image pickup surface of a semiconductor substrate by a plurality of divisional exposure operations, and in which the outputs are being read out via the same channel. The underlying structure of the image sensing element outputting the pixel signals in applicant's claimed invention (i.e., the first and second light receiving areas) differs significantly from the underlying structure of two independent image sensing elements outputting the pixel signals in Saito, et al. (i.e., two line sensors 11a and 11b). Accordingly, the correction of sensitivity differences between pixel signals outputted from two different image sensing elements via different channels, as disclosed in Saito, et al., cannot be equated to the correction of the differences between output levels of pixel signals output from two areas of the same image sensing element via the same channel, as recited in applicant's claims 1 and 6. Thus, Saito, et al. does not teach the correction device of applicant's independent claims 1 and 6, because it makes no mention of correcting the difference between output levels of

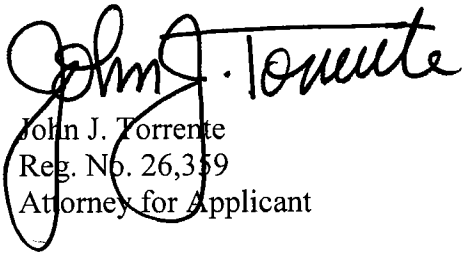
pixel signals from two areas of the same image sensing element output via the same channel.

Accordingly, applicant's amended independent claims 1 and 6, each of which recites a first light receiving area and a second light receiving area which are formed on an image pickup surface of a semiconductor substrate by the plurality of divisional exposure operations, wherein pixel signals obtained by the first light receiving area and the second light receiving area are read out from the image sensing element via a same channel and a correction device which corrects difference between output levels of pixel signals output from the first light receiving area and the second light receiving area via the same channel, and their respective dependent claims, patentably distinguish over the TeWinkle patent and the Saito, et al. patent, taken alone or in combination with one another. The Okisu, et al. patent fails to add anything to change the above conclusion.

In view of the above, it is submitted that applicant's claims are patentably distinguished over the cited references. Accordingly, reconsideration of the claims is respectfully requested. If the Examiner believes that an interview would expedite consideration of this Amendment or of the application to issue, a request is made that the Examiner telephone applicant's undersigned attorney at (212) 790-9273.

Dated: April 15, 2010

Respectfully submitted



COWAN, LIEBOWITZ & LATMAN, P. C.
1133 Avenue of the Americas
New York, New York 10036
T (212) 790-9273

John J. Torrente
Reg. No. 26,359
Attorney for Applicant